(703) 312-6600
Amendments to the Claims:

1. (Currently Amended) An electronic device comprising a substrate and an electronic circuit element flip-chip-connected on said substrate,

wherein a connection is made by gold-tin (Au-Sn) bonding~~, gold-silver (Au-Ag) bonding, gold-aluminum (Au-Al) bonding or gold-gold (Au-Au) bonding~~ between a chip electrode of said electronic circuit element and an internal electrode on said substrate, and

~~a peripheral portion or a portion which needs to be~~ the connection is sealed ~~in~~ between said electronic circuit element and said substrate opposed to said electronic circuit element~~ are bonded to each other and sealed by the same method as said bonding method~~ in a peripheral connection also formed therebetween by the gold-tin bonding, and

an alloy containing gold and tin is formed in each of the connection and the peripheral connection.

2. (Original) The electronic device according to claim 1,

wherein said electronic circuit element comprises a piezoelectric element.

3. (Original) The electronic device according to claim 1,

wherein said electronic circuit element comprises a SAW chip, a thin film bulk acoustic resonator (FBAR) or a microelectromechanical system (MEMS).

4. (Currently Amended) The electronic device according to claim 1,

wherein said the surface of the electrode on said electronic circuit element is plated with gold (Au) and the surface of the internal electrode on said substrate is plated with tin (Sn)~~, silver (Ag), aluminum (Al) or gold (Au)~~.

5. (Original) The electronic device according to claim 1,

wherein said substrate comprises a printed substrate or a flexible substrate.

6. (Original) The electronic device according to claim 1,

wherein said substrate comprises a metal core substrate.

7. (Original) The electronic device according to claim 1,

wherein said substrate comprises a glass substrate or a ceramic substrate.

8. (Original) The electronic device according to claim 1,

wherein said substrate comprises a silicon substrate.

9. (Currently Amended) The electronic device according to claim 6,

wherein the metal core substrate has a core metal and a resin layer attached to a surface of the core metal opposite to the electronic circuit element,

~~a peripheral sealing portion of said metal core substrate~~ a portion of the surface the core metal exposed from the resin layer is metalized to form the peripheral connection formed thereon, and the peripheral connection and the core metal are electrically connected to each other.

10. (Withdrawn) A method of manufacturing an electronic device of a chip size, comprising:

making a connection by gold-tin (Au-Sn) bonding, gold-silver (Au-Ag) bonding, gold-aluminum (Au-Al) bonding or gold-gold (Au-Au) bonding between an electrode of each of electronic circuit elements each having the electrode and a peripheral portion plated with gold (Au) and the corresponding one of internal electrodes of a multiple-piece-forming substrate on which the internal electrodes and sealing portions plated with tin (Sn), silver (Ag), aluminum (Al) or gold (Au), external electrodes and through hole wiring for connecting the internal and external electrodes are formed, said bonding being performed by heating and pressing the electronic circuit elements and the substrate while opposing the electronic circuit elements and the substrate to each other;

sealing the peripheral portion of each of the electronic circuit elements and the sealing portion of the substrate opposed to the peripheral portion of the electronic circuit elements by the same gold-tin (Au-Sn) bonding, gold-silver (Au-Ag) bonding, gold-aluminum (Au-Al) bonding or gold-gold (Au-Au) bonding; and

separating the electronic circuit elements one from another by cutting at the sealing portions to obtain the chip-size electronic device.

11. (Withdrawn) A method of manufacturing an electronic device of a chip size, comprising:

making a connection by gold-tin (Au-Sn) bonding, gold-silver (Au-Ag) bonding, gold-aluminum (Au-Al) bonding or gold-gold (Au-Au) bonding between an electrode of each of electronic circuit elements each having the electrode and a peripheral portion plated with gold (Au) and the corresponding one of internal electrodes of a multiple-piece-forming substrate on which the internal electrodes and sealing portions plated with tin (Sn), silver (Ag), aluminum (Al) or gold (Au), external electrodes and through hole wiring for connecting the internal and external electrodes are formed, said bonding being performed by heating and pressing the electronic circuit elements and the substrate while opposing the electronic circuit elements and the substrate to each other;

sealing the peripheral portion of each of the electronic circuit elements and the sealing portion of the substrate opposed to the peripheral portion of the electronic circuit elements by the same gold-tin (Au-Sn) bonding, gold-silver (Au-Ag) bonding, gold-aluminum (Au-Al) bonding or gold-gold (Au-Au) bonding; and

obtaining the chip-size electronic device by grooving the sealing portions in the direction of mounting of the electronic circuit elements to a depth reaching the substrate, metalizing the upper surface and the grooved portions, and separating the electronic circuit elements one from another by cutting at the sealing portions.

12. (Withdrawn) A method of manufacturing an electronic device, comprising:

forming a chromium (Cr) or copper (Cu) film as a plating base film on a surface acoustic wave wafer on which interdigital electrodes and chip electrodes having aluminum (Al) as a major constituent are formed;

forming a film of a resist thereon by applying the resist, setting the

resist by hearing, partially removing the plating resist at positions corresponding to the chip electrodes by irradiation with ultraviolet rays and development;

forming a gold plating of a desired thickness on the chip electrode portions;

thereafter removing the resist;

forming a surface acoustic wave wafer with a gold (Au) plating by selectively removing chromium (Cr) or copper (Cu) forming the plating base film by etching using diammonium cerium nitrate ($(CeNH_4)_2(N_3)_6$) so as not to affect the interdigital electrodes and the chip electrodes having aluminum (Al)as a major constituent; and

manufacturing the electronic device by using the surface acoustic wave wafer and by the method according to claim 5 or 6.

13. (Withdrawn) The method according to claim 10, wherein the substrate comprises a metal core substrate.

14. (Withdrawn) The method according to claim 11, wherein the substrate comprises a metal core substrate.

15. (Withdrawn) The method according to claim 12, wherein the substrate comprises a metal core substrate.

16. (Withdrawn) The method according to claim 13, wherein a core metal and a peripheral sealing portion of the metal core substrate are electrically connected to each other.

17. (Withdrawn) The method according to claim 14, wherein a core metal and a peripheral sealing portion of the metal core substrate are electrically connected to each other.

18. (Withdrawn) The method according to claim 15, wherein a core metal and a peripheral sealing portion of the metal core substrate are electrically connected to each other.

19. (New) The electronic device according to claim 1,

wherein the alloy containing gold and tin is a gold-tin intermetallic compound.

20. (New) The electronic device according to claim 19,

wherein a melting point of the gold-tin intermetallic compound is higher than that of tin.

21. (New) The electronic device according to claim 19,

wherein the chip electrode and a first metal layer surrounding the chip electrode are formed on a surface of the electronic circuit element opposite to a surface of the substrate,

the internal electrode and a second metal layer surrounding the internal electrode are formed on the surface of the substrate opposite to the surface of the electronic circuit element, and

the peripheral connection including the alloy containing gold and tin is formed between the first metal layer and the second metal layer.

22. (New) The electronic device according to claim 21,

wherein a gold bump is formed on the chip electrode,

a gold projection is formed on the first metal layer,

a tin layer is formed on each of a surface of the internal electrode and a surface of the second metal layer both opposite to the surface of the electronic circuit element,

the alloy containing gold and tin is formed in the connection at an interface between the tin layer on the internal electrode and the gold bump contacting with each other, and

the alloy containing gold and tin is formed in the peripheral connection at an interface between the tin layer on the second metal layer and the gold projection contacting with each other.

23. (New) The electronic device according to claim 22,

wherein each of the alloys containing gold and tin formed in the connection and the peripheral connection is the gold-tin intermetallic compound having a melting point higher than that of tin.

24. (New) The electronic device according to claim 22,

wherein each of the tin layers on the internal electrode and the second metal layer consists only of tin.

25. (New) The electronic device according to claim 22,

wherein the tin layer is formed by plating each of the internal electrode and the second metal layer with tin.

26. (New) The electronic device according to claim 22,

wherein the chip electrode and the first metal layer are formed of aluminum.

27. (New) The electronic device according to claim 22,

wherein the internal electrode and the second metal layer are formed of copper.

28. (New) The electronic device according to claim 1,

wherein the alloy containing gold and tin is formed by melting the tin layers at the respective interfaces between the tin layer on the internal electrode and the gold bump and between the tin layer on the second metal layer and the gold projection.

29. (New) The electronic device according to claim 1,

wherein the connection is encapsulated in an airtight manner between the electronic circuit element and the substrate opposed to each other by the peripheral connection.

30. (New) An electronic device comprising:

an electronic circuit element having a first surface on which a first electrode is formed; and

a substrate having a second surface arranged opposite to the first surface, and a second electrode electrically being formed on the second surface and connected to the first electrode,

wherein a sealing member is formed between the first surface of the electronic circuit element and the second surface of the substrate to surround the first electrode in the first surface and the second electrode in the second surface,

the sealing member has an alloy including tin (Sn) and gold (Au) being formed therein and having a melting point higher than the melting point of tin.

31. (New) The electronic device according to claim 30,

wherein the alloy including tin and gold is a gold-tin intermetallic compound.